Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1-40. (Cancelled)

41. (New) A system comprising:

a gas void fraction sensor operable to measure a gas void fraction in a flow of fluid;

a flowmeter comprising:

a vibratable flowtube to receive the flow of fluid;

a driver connected to the flowtube and operable to impart motion to the flowtube;

a sensor connected to the flowtube and operable to sense the motion of the flowtube and generate a sensor signal; and

a controller connected to receive the sensor signal from the sensor and to receive the measured gas void fraction from the gas void fraction sensor, the controller being operable to determine a first flow rate of a first phase within the flow of fluid based on the measured gas void fraction received from the gas void fraction sensor, and determine a second flow rate of a second phase within the flow of fluid based on the measured gas void fraction received from the gas void fraction sensor.

42. (New) The system of claim 41 wherein the gas void fraction sensor is external to the flowmeter.

43. (New) The system of claim 42 wherein the gas void fraction sensor is a sonar-based gas void fraction sensor.

44. (New) The system of claim 43 wherein the flowmeter comprises a Coriolis flowmeter.

45. (New) The system of claim 41 wherein the first phase includes a gas and the second phase includes a liquid.

46. (New) The system of claim 41 wherein the controller is operable to correct an apparent density of the flow detected by the flowmeter to obtain a corrected density of the flow.

47. (New) The system of claim 46 wherein the controller is operable to correct the apparent density based on a theoretical relationship between the apparent density and the corrected density.

48. (New) The system of claim 46 wherein the controller is operable to correct the apparent density based on an empirical relationship between the apparent density and the corrected density.

49. (New) The system of claim 46 wherein the controller is operable to correct the apparent density based on a table storing relationships between the apparent density and the corrected density.

50. (New) The system of claim 41 wherein the controller is operable to correct an apparent mass flow rate of the flow detected by the flowmeter to obtain a corrected mass flow rate of the flow.

51. (New) The system of claim 50 wherein the controller is operable to correct the apparent mass flow rate based on a theoretical relationship between the apparent mass flow rate and the corrected mass flow rate.

52. (New) The system of claim 50 wherein the controller is operable to correct the apparent mass flow rate based on an empirical relationship between the apparent mass flow rate and the corrected mass flow rate.

53. (New) The system of claim 41 wherein the controller is operable to determine the first flow rate and the second flow rate based on corrected values for a detected density and detected mass flow rate of the flow in addition to the measured gas void fraction.

54. (New) The system of claim 41 wherein the controller is operable to determine the first flow rate and the second flow rate based on densities of the first phase and the second phase, respectively, in addition to the measured gas void fraction.

55. (New) The system of claim 41 wherein the controller is operable to determine a first superficial velocity of the first phase and a second superficial velocity of the second phase, based on the first flow rate and the second flow rate, respectively.

56. (New) The system of claim 55 wherein the controller is operable to determine a flow regime of the two-phase flow, based on the first superficial velocity and the second superficial velocity.

57. (New) The system of claim 56 wherein the controller is operable to determine a slip velocity between the first phase and the second phase, based on an average velocity of the first phase and an average velocity of the second phase.

58. (New) The system of claim 57 wherein the controller is operable to provide corrections to the first flow rate and the second flow rate, based on the first and second superficial velocities, the determined flow regime, or the slip velocity, to thereby obtain a corrected first flow rate and a corrected second flow rate.

59. (New) A method comprising:

measuring a gas void fraction of a flow of fluid using a gas void fraction sensor;

measuring a parameter of the flow of fluid using a Coriolis meter;

determining a flow rate of a first phase in the flow of fluid based on the gas void fraction measured by the gas void fraction sensor and the parameter measured by the Coriolis meter; and

determining a flow rate of a second phase in the flow of fluid based on the gas void fraction measured by the gas void fraction sensor and the parameter measured by the Coriolis meter.

60. (New) The method of claim 59 wherein measuring the gas void fraction of the flow of fluid using the gas void fraction sensor comprises measuring the gas void fraction of the flow of fluid using a sonar-based gas void fraction sensor.

61. (New) A system comprising:

a gas void fraction sensor operable to measure a gas void fraction in a flow of fluid;

a flowmeter comprising:

a vibratable flowtube to receive the flow of fluid;

a driver connected to the flowtube and operable to impart motion to the flowtube; and

a sensor connected to the flowtube and operable to sense the motion of the flowtube and generate a sensor signal; and

a processing device coupled to the flowmeter and the gas void fraction sensor, the processing device operable to determine a first flow rate of a first phase within the flow of fluid based on the measured gas void fraction, and determine a second flow rate of a second phase within the flow of fluid based on the measured gas void fraction.